

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
MULCHING

(Ac.)

CODE 484

DEFINITION

Applying plant residues, by-products or other suitable materials produced off site, to the land surface.

PURPOSE

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Establish vegetative cover
- Improve soil condition and increase soil fertility

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where mulches are needed. This practice may be used alone or in combination with other practices.

CRITERIA

General Criteria Applicable To All Purposes

The selection of mulching materials will depend primarily on site conditions and the material's availability. Mulch materials shall consist of natural and/or artificial materials such as plant residue, wood bark or chips, by-products, gravel, plastic, fabric, animal manure, rice hulls, and materials from food processing plants or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period.

Mulching is generally performed after grading, soil surface preparation and seeding and

plantings are complete. Soil surface shall be prepared in order to achieve the desired purpose.

The mulch material shall be evenly applied and anchored to the soil. Tackifiers, emulsions, pinning, netting, crimping or other acceptable methods of anchoring will be used if needed to hold the mulch in place for specified periods.

Manufactured mulches shall be applied according to the manufacturer's specifications.

Mulching operations shall comply with federal, state and/or local laws and regulations during the installation, operation and maintenance of this practice.

Mulch material shall be relatively free of disease, noxious weed seeds, and other pests and pathogens.

Additional Criteria To Conserve Soil Moisture

Mulch materials applied to the soil surface shall provide at least 60 percent cover to reduce potential evaporation.

Mulch material shall be applied prior to moisture loss. Prior to mulching, ensure soil under shallow rooted crops is moist, as these crops require a constant supply of moisture.

Additional Criteria To Moderate Soil Temperature

Mulch materials shall be selected and applied to obtain 100 percent coverage over the area treated. The material shall be of a significant thickness to persist for the period required for the temperature modification.

Additional Criteria To Provide Erosion Control

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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When mulching with cereal grain straw or grass hay, apply in sufficient amounts to provide 70 percent ground cover. Mulch rate shall be determined using current erosion prediction technology to reach the soil erosion objective.

When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply to a 2-inch thickness if the soil is not well-drained, and to a 3- to 4-inch thickness if drainage is good. More finely textured mulches, which allow less oxygen penetration than coarser materials, should be no thicker than 1 or 2 inches. The mulch material shall provide no greater than 80 percent ground cover in order to ensure adequate air drainage.

Gravel or other inorganic material shall be applied approximately 2 inches thick and shall consist of pieces 0.75 to 2 inches in diameter. The mulch material shall provide no more than 90 percent ground cover in order to ensure adequate air drainage.

Additional Criteria To Suppress Weed Growth

The thickness of mulch will be determined by the size of the plant being mulched. Small plants must not be smothered. Mulches shall be kept clear of the stems of plants where disease is likely to occur. Mulches applied around growing plants or prior to weed seedling development shall have 100 percent ground cover. Thickness of the mulch shall be adequate to prevent emergence of targeted weeds. Plastic mulches may be used.

Additional Criteria To Establish Vegetative Cover

Mulch shall be applied at a rate that achieves 50 percent ground cover to provide protection from erosion and runoff and yet allow adequate light and air penetration to the seedbed to ensure proper germination, emergence, and disease suppression.

Additional Criteria To Improve Soil Condition And Increase Soil Fertility

To increase soil fertility, apply mulch materials with a carbon to nitrogen ratio (C:N) less than 30 to 1 such as animal manure, bio-solids,

food processing wastes, or similar materials. Apply other practices such as contouring, filter strips or riparian forest buffers to assure that runoff from the mulched areas will not transport mulching materials to sensitive waterbodies. Do not apply mulch with C:N less than 20:1 to the area of designed flow in watercourses.

Credit nutrients applied with the mulch to the nutrient budget.

Use the Soil Conditioning Index to assess soil quality impacts.

CONSIDERATIONS

Consider the effects of mulching on evaporation, infiltration and runoff. Mulch material may affect microbial activity in the soil surface, increase infiltration, and decrease runoff, erosion and evaporation. Increased infiltration may increase nutrient and chemical transport below the root zone. The temperature of the surface runoff may also be lowered.

Mulched soil retains moisture, requires less watering and reduces the chance of water stress on plant materials. Mulch also minimizes evaporation from the soil surface and hence reduces losses from bare soil areas.

Mulch materials high in organic matter with a high water holding capacity and high impermeability to water droplets may adversely affect the water needs of plants.

Clear and infra-red transmissible (IRT) plastics have the greatest warming potential. They are transparent to incoming radiation and trap the longer wavelengths radiating from the soil. Black mulches are limited to warming soils by conduction only and are less effective.

Clear mulches allow profuse weed growth and may negate the benefits of soil warming. Black mulches provide effective weed control. Wavelength selective (IRT) blends the soil warming characteristics of clear mulch with the weed control ability of black mulch.

Consider potential toxic allopathic effects that mulch material may have on other organisms. Animal and plant pest

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species may be incompatible with the site.

Consider the potential for increased pathogenic activity within the applied mulch material.

Keep mulches 3 to 6 inches away from plant stems and crowns to prevent disease and pest problems.

Deep mulch provides nesting habitat for ground-burrowing rodents that can chew extensively on bark on tree trunk and/or tree roots. Light mulch applied after the first cold weather may prevent rodents from nesting.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. Documentation shall include:

- Type of mulch material used
- Percent cover and/or thickness of mulch material
- Timing of application

GENERAL

Mulch is essential on steep, erosive sites. Mulch should be used on all critical areas where slopes are steeper than 3 percent.

Mulch is desirable on constructed waterways, outlets and shaped natural waterways. Waterways and areas where water concentrates should be lined with jute lining, upholders' burlap, excelsior blanket, fiberglass blanket, textile soil retention blanket or mulched with straw and tied down with poultry wire or commercial mulch netting.

Concentration of water from off-site areas, or water draining over cut banks, should be diverted by the use of temporary diversions, closed drains, ditches, lined waterways or other erosion control methods. Cut banks and fill slopes should be graded uniformly enough so that runoff water does not concentrate. Loosen hard, compact soil with chisel plow or

- Site preparation
- Listing of netting, tackifiers, or method of anchoring, and
- Operation and maintenance.

OPERATION AND MAINTENANCE

Mulched areas will be periodically inspected, and mulch shall be reinstalled or repaired as needed to accomplish the intended purpose.

Removal, incorporation, bio- or photo-degradation of mulch and associated materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the mulch.

Prevent or repair any fire damage to the mulch material.

Properly collect and dispose of artificial mulch material after intended use.

Monitor and control undesirable weeds in mulched areas.

SPECIFICATIONS

similar implement. This allows water to move into the soil and reduces runoff.

Mulch material shall not contain seeds of competing plants. Areas mulched with hay, straw, wood chips or shredded plant residues should receive 20 – 25 lbs. per acre of nitrogen in addition to the amount required for plant growth to offset the tie-up of nitrogen by decomposition of carbonaceous materials.

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MULCH MATERIALS FOR ESTABLISHING VEGETATION

Use one of the materials listed below:

Material	Rate: Tons per acre	Rate: Lbs. per 1,000 sq. ft.
Hay or straw	1½ - 2	70 – 90
Sawdust – wood chips	4 – 6	185 – 275
Poultry litter or manure	4 – 6	185 – 275
Shredded residues (leaves, crop residue)	1½ - 2½	70 – 115
Wood cellulose fiber	½ - ¾	24 – 34
Commercial mulch materials	Cover as specified by manufactures.	
Upholsterer's Burlap	Cover as specified below.	

Of the various kinds of hay and straw, grain straw is preferable. It spreads easier by hand and does not contain weed seed.

On areas where it is desirable to establish native vegetation, broomsedge cut and baled after seed are mature can be used to mulch the area without seeding. However, be sure that the soil surface is loose so broomsedge seedlings can become established and that the soil has enough phosphorus to support broomsedge. A light application of fertilizer each year for 3 years may be required on such sites:

Mulch shall be applied within 24 hours after seeding.

Straw or Hay

Straw or hay may be applied by hand or with a mulch blower. Straw or hay will be applied uniformly over the area, leaving about 25 percent of the soil surface exposed.

Mechanical Anchoring

If waterways or other areas where concentrations of water occur are mulched with straw or hay, the mulch in these areas will

be tied down with commercial netting, poultry wire, or sprayed with asphalt emulsions.

When poultry wire netting is used to anchor straw mulch, tie it down with wood stakes or heavy-duty 6-inch wire staples every 4 feet in all directions. Straw or hay mulch can be tied down by driving wooden stakes every 4 feet in all directions, tying jute string diagonally and in straight lines, and driving the stakes until the string contacts the ground. It is desirable to anchor straw or hay mulch on all areas.

Asphalt sprayed uniformly on the mulch, as it is ejected from the blower is more effective than asphalt applied as a separate operation. Use 175 gallons of Emulsified Asphalt SS-1h or equivalent (Specification Section 1002 Louisiana Standard Specifications for Roads and Bridges 1982 edition) per ton of mulch.

A disk harrow, or similar implement, with the disk set straight, may be used to press the mulch into the soil. Best results are obtained with discs 20-inches or more in diameter and 8 – 12 inches apart. The edges of the disc should be dull enough not to cut the mulch but to press it into the soil, leaving much of it in an erect position.

Natural Anchoring

Rye, wheat or oats can be planted in the fall to anchor the mulch. Pearl millet or sorghum-sudan hybrids can be used to anchor mulch spread in the summer. Sow seed broadcast before mulch is applied and irrigate for rapid germination if necessary.

Table 1 – Plants to use to anchor mulch:

		Seeding Rate	Seeding Rate
Treatment Period	Species	lbs/acre	lbs/1000 sq. ft.
Summer	Pearl millet	15	0.3
	Sorghum		
	Hybrids	15	0.3
Winter	Rye	35	0.8
	Oats	50	1.1
	Wheat	30	0.70

Wood Waste and Shredded Residues

Wood waste mulch, sawdust, wood chips and bark, and shredded residues should not be used on slopes steeper than 3:1. On steep slopes, these materials can be moved by intense rain.

Wood Cellulose Fiber (Hydromulching)

Wood cellulose fiber mulch will be applied with hydraulic seeding equipment. Fertilizer, seed and wood fiber will be mixed with water to form homogeneous slurry and applied within one hour after mixing. Use the same rates of seed and fertilizer as in conventional methods. Slurry will be sprayed to get uniform coverage on the soil surface.

Commercial Mulch Materials

Follow manufacturer's instructions for use of commercial mulch materials such as fiberglass, jute, textile, and excelsior soil retention blankets.

Surface spray liquid emulsions will not be used unless their effectiveness has been verified by the State Resource Conservationist.

Upholsterer's Burlap

The surface shall be smooth and free of obstructions such as rocks, roots, clods or heavy grass residue.

Use erosion checks across the waterways. Erosion checks are trenches dug at least 4 inches deep. The material is cut and stapled in the bottom of the trench. The trench is back-filled and packed. The next length of material is lapped at least 6 inches over the previous length. Maximum distance of erosion checks shall not exceed 50 feet on slopes up to 5 percent. On slopes over 5 percent, the maximum distance between erosion checks shall not exceed 35 feet.

Jute lining shall be laid loosely in contact with the soil surface. When more than one width of jute material is used lengthwise, overlap shall be at least 3 inches. Commercial 6-inch heavy duty, 11-gauge wire staples or staples cut and made from No. 8- or 9- gauge wire can be used. The material will be stapled at 12-inch intervals in erosion check trenches and across the end laps. Three feet intervals will

be used along the edge and length-wise laps.

Mulch for Temporary Protection Without Seeding

Wood chips, sawdust or bark spread 1 to 2 inches deep can be used for temporary mulch protection without seeding. Wood waste should not be applied on slopes steeper than 3:1. No anchoring is needed.

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